

Lighting & Recycling

National Energy Star Lighting Partner Conference

- Background
- Environmental Perspective
- Regulations
- Industry Activities

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Lamps and Mercury

- All Fluorescent and HID Lamps Use Mercury
 - Mercury is essential to efficient light generation
 - Vaporized Mercury efficiently produces UV energy which is converted into visible light by the phosphor.
 - Non-Mercury Containing Light Sources (Incandescent) are 60 to 90% less efficient than mercury containing lighting sources.
- CFL Lamps generally have the lowest mercury content of any mercury-containing lamp
 - Traditional Mercury Content ~ 50 mg/Lamp
 - Average CFL mercury Content ~ 4 mg/lamp

Lamps and Recycling

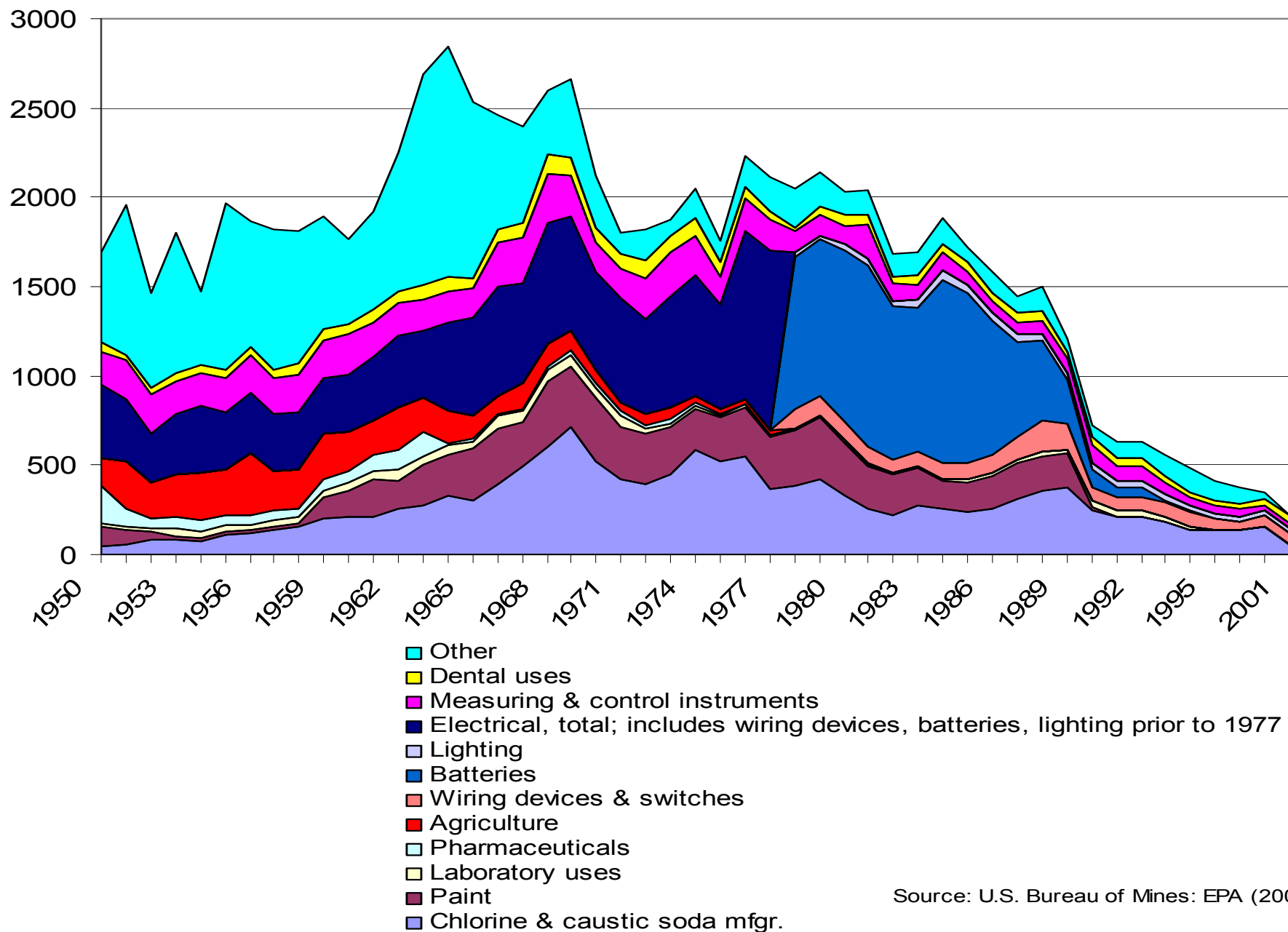
- In the USA, lamp recycling starting in the late 1980's and early 1990's in CA.
- Changes in 1990 Federal Waste Disposal Laws increased the number of lamp recyclers and the number of lamps being recycled.
 - 2003 National Lamp Recycling Rate - 23.3%
 - 2003 Business Lamp Recycling Rate - 29.2%
- CFL Lamps are generally generated by consumers one at a time.
 - Most recycling companies are focused on high volume commercial building generation where the high volume of lamps has the greatest potential to produce an environmental issue.

Lighting & Recycling

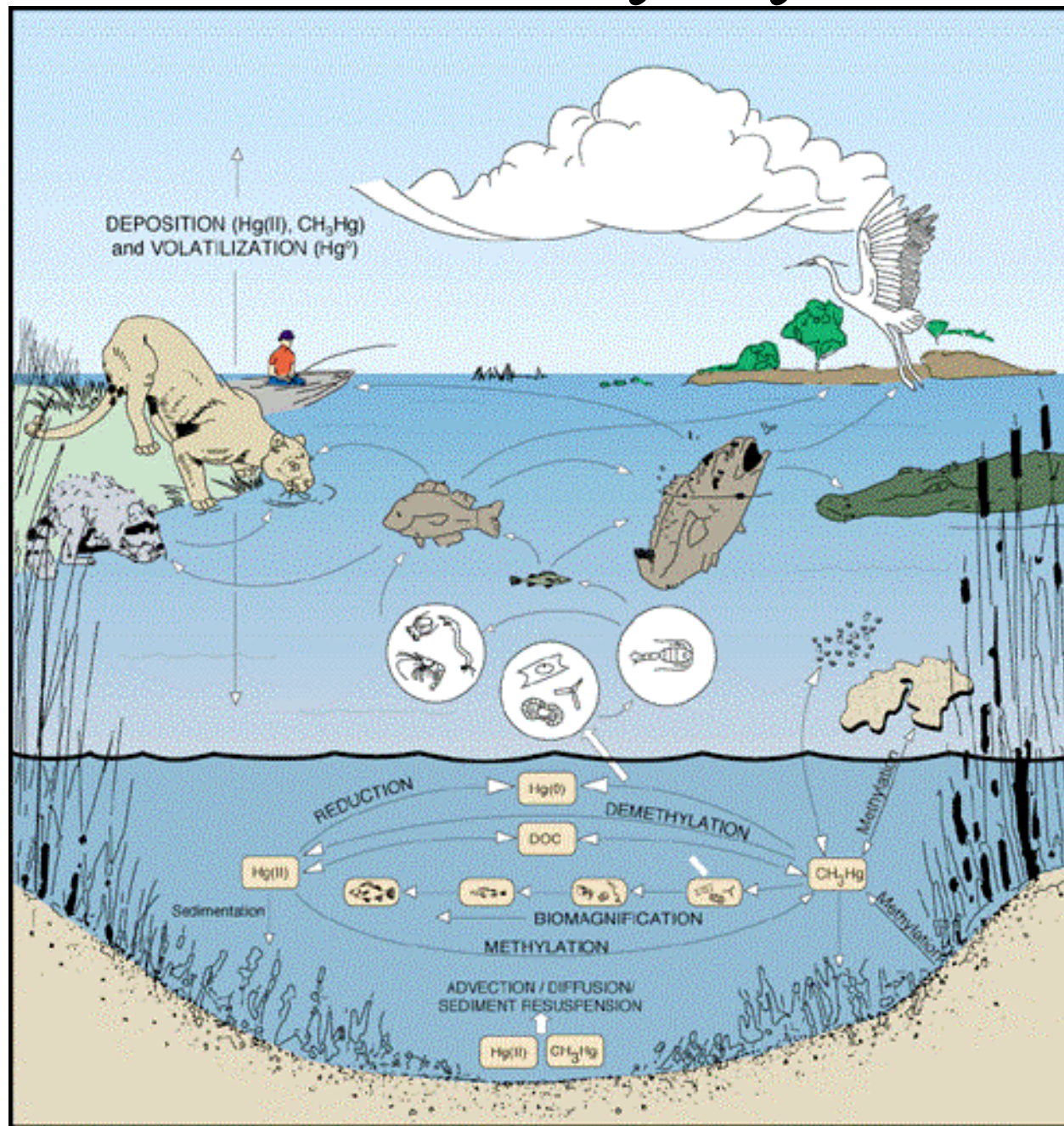
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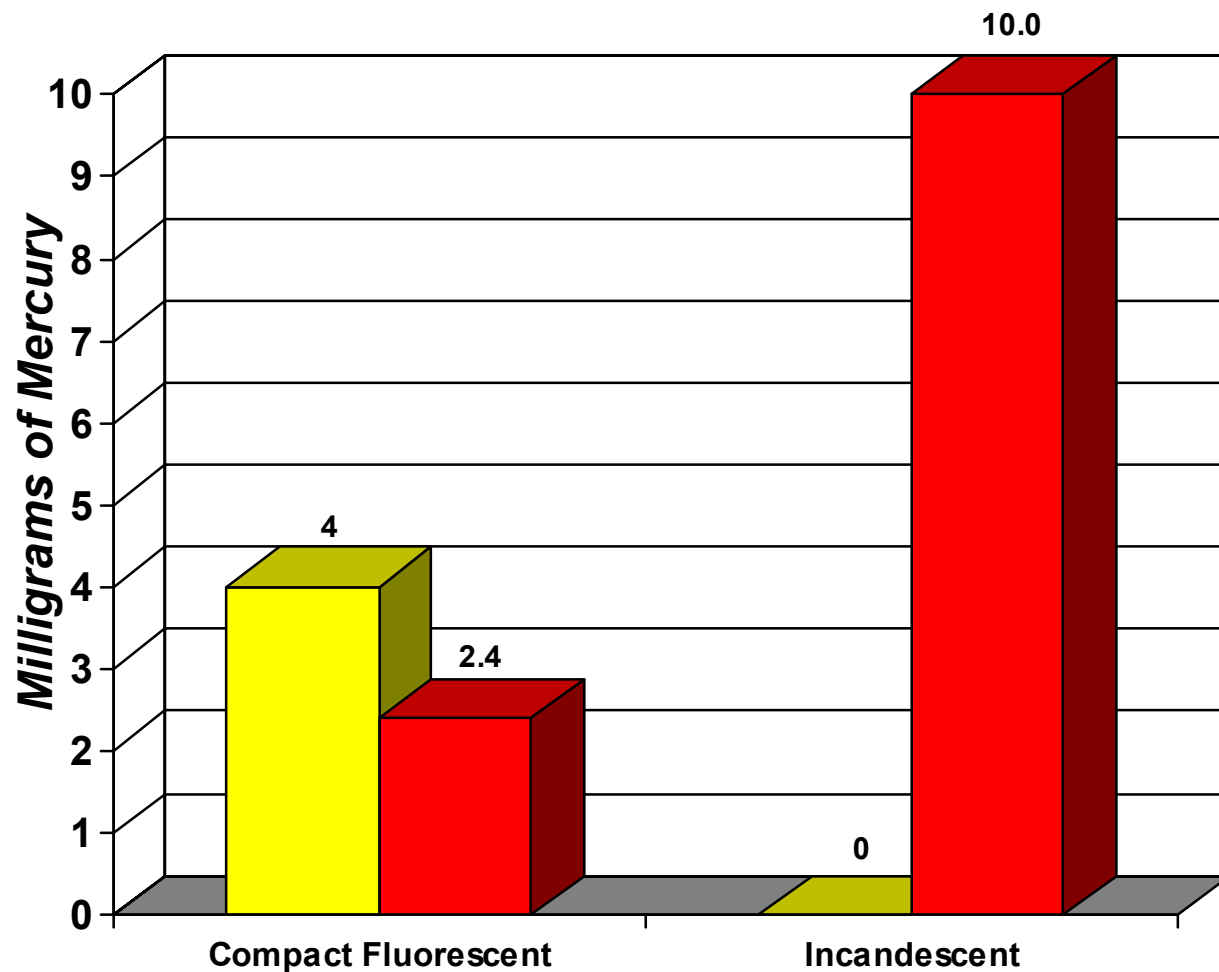
U.S. mercury consumption, by end use; metric tons



The Mercury Cycle



Mercury Emissions Over 5 Year Life



■ Hg Used in Product: Landfilled or Recycled
■ Hg Released From Power Generation

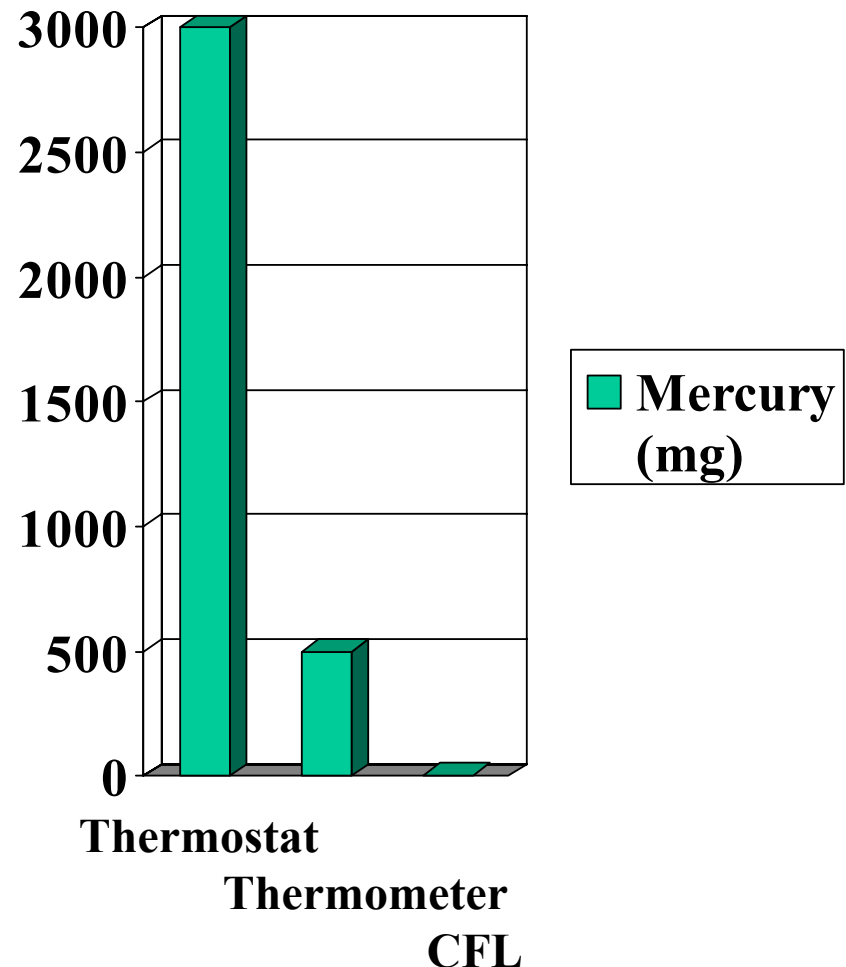
Hg from fluorescent lamp disposal is small compared to the Hg released from power generation required to operate the lamp

Incandescent lamps contain no mercury but result in the highest Hg emissions

*Source US EPA, June 2002 – Fact Sheet: Mercury in Compact Fluorescent Lamps

Environmental Perspective

- Typical Mercury Amounts
- Thermostat : 3000 mg
- Thermometer: 500 mg
- CFL: 4 mg
- 1 Oz = 28,350 mg
- 10 mg \sim 1/3000 oz



New Study Shows LANDFILLS EFFECTIVELY CONTROL THE RELEASE OF HEAVY METALS

03.09.2004

Silver Spring, MD (March 9, 2004) –The SWANA Applied Research Foundation today released the results of a year-long study that concludes that municipal solid waste landfills can provide for the safe, efficient and long-term management of products containing heavy metals and can effectively control the release of heavy metals to the environment.

The Applied Research Foundation found that the natural processes that occur within a MSW landfill, such as precipitation and absorption, effectively inhibit heavy metals from dissolving into the leachate or being released from the landfill in the form of landfill gas. The study presents extensive data that show that heavy metal concentrations in leachate and landfill gas are generally far below the limits that have been established to protect human health and the environment.

According to the report, 130,200 tons of heavy metals were placed in MSW landfills in the year 2000. Lead represented over 98% of these metals. Cadmium (2.1%) and mercury (0.3%) were also found. Discarded consumer electronics, batteries, thermometers, electronic and electric switches and pigments were major contributors.

LANDFILLING

■ LANDFILL LEACHATE - RESEARCH TRIANGLE INSTITUTE ANALYZED 109 LANDFILLS

- 88 landfills had no detectable mercury
- 15 landfills were below the drinking water standard (.002 mg/l)
- 6 landfills were slightly above the drinking water standard
- 0 landfills were above TCLP limit (0.2 mg/l)

RESULTS: LESS THAN .001% OF MERCURY ESCAPES IN LANDFILL LEACHATE

■ LANDFILL GAS - SWEDISH STUDY MEASURES AIR ABOVE LANDFILLS

RESULTS: LESS THAN .001% OF MERCURY ESCAPES IN LANDFILL GASES

MORE THAN 99.99% OF MERCURY IS RETAINED WITHIN LANDFILL

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Existing Lamp Disposal Bans

- **Recent Mercury-Containing Lamp Disposal Bans**
 - **Maine** - Disposal Ban in effect on July 15, 2002.
 - **Rhode Island** -Ban in effect on January 1st, 2004
 - **California** - Ban in effect on February 9th, 2004
 - Exemption of 30 lamp/mo from 2004 to 2006.
 - Captures all mercury containing lamps, even low mercury lamps that pass the current CA regulations.
- **Existing Lamp Disposal Bans**
 - Minnesota, Vermont, Connecticut
- **Existing Incineration Bans**
 - Florida (60% of State), Illinois (2% of State)
- **Home Owners are generally exempt from Regulations**
 - Exceptions: Minnesota, Maine (1/1/2005), Vermont

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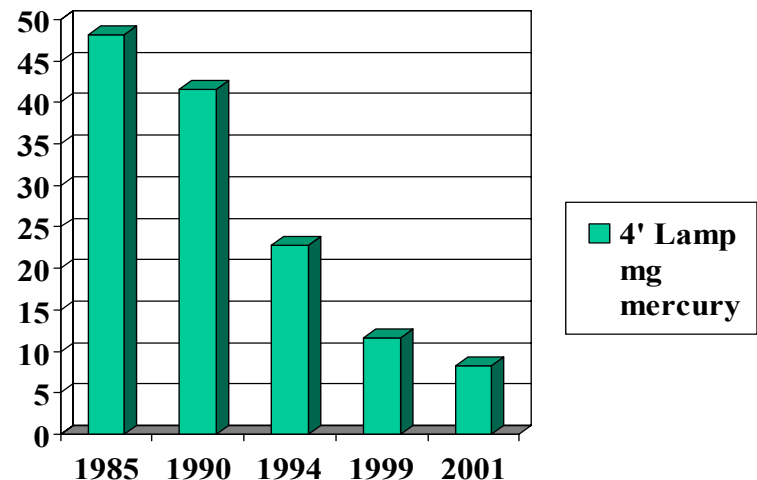
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Manufacturing Activities

- **Since 1990:**
 - **Lamp Manufacturers have:**
 - Greatly reduced mercury content in lamps
 - Greatly improved lamp designs
 - Introduced dozens of ECO lamps that consistently pass the TCLP test will not leach if landfill disposed.
 - Marked new ECO lamp types with:
 - ECO in the descriptive code
 - Or/And added Green Marking such as Green Monograms

Industry-wide 83% reduction in mercury content in a 4' lamp



**Reaching lamp performance limits of mercury reduction.
Now searching for energy-efficient mercury-free solution.**

Lamp Recycle .org



Your one-stop
information source
for recycling
spent
mercury-containing
lamps.

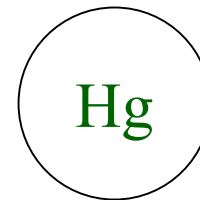
Facilities managers ♦ MRO personnel ♦ Property managers ♦
Environmental programs managers ♦ Lamp distributors ♦
Lamp manufacturers ♦ Government employees

Lamp Labeling

Environmental

- **VT, CT, WA, NY & MD Labeling Laws**

- Manufacturers must indicate which lamps contain mercury and provide disposal information.
- Impacts all Fluorescent, Metal Halide, HPS & Mercury Vapor
- **Lamp Monogram** will be labeled with:



- **Lamp Package** will be labeled with

Hg	Lamp Contains Mercury
Manage in Accord with Disposal Laws	
See: www.lamprecycle.org or 1-800-435-4448	

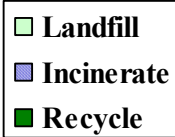
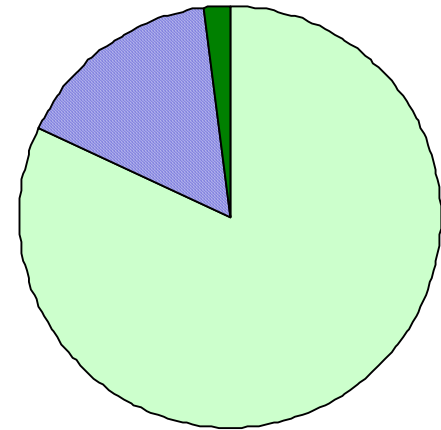
Lamp Recycling OutReach Project

- Objective –
 - Improve Awareness of Lamp Recycling Options
 - Improve Awareness of Regulations
 - Increase Recycling Rate
- Joint Activity
 - Association of Lighting and Mercury Recyclers (ALMR)
 - National Electrical Manufacture Association (NEMA)
 - Solid Waste Association
- EPA Funded
- Education/Information Disk Available
 - ALMR.org

U.S LAMP DISPOSAL TRENDS

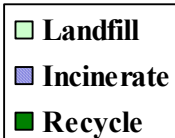
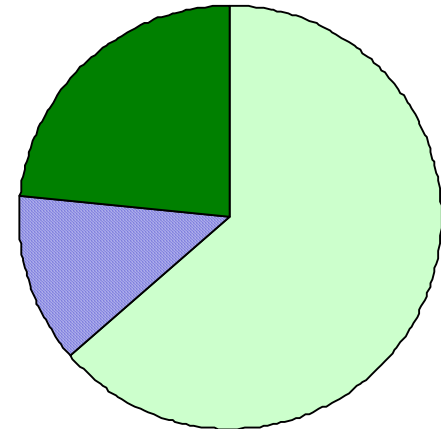
1992 EPA ESTIMATES:

- 82% LANDFILLED
- 16% INCINERATED
- 2% RECYCLED



2003 INDUSTRY ESTIMATE:

- 64% LANDFILLED
- 13% INCINERATED
- 23% RECYCLED



Consumer Lamp Recycling Limited

- To see if program exists in your area
 - Earth911.org
 - Call: 1-800-CLEAN-UP
 - Household Hazardous Waste
 - Fluorescent Bulb Disposal
 - Identifies nearest residential mercury recycling facility
 - Check with local municipality for household hazardous waste programs

Questions?



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